INDEX TO VOLUME XXIII.*

A

Academy, National, list of papers, 79.
Acid, aconitic, from Sorghum, 488.
  carbonic, in sea-water, 53.
  sulphuric, freezing point of, 236.
Aerolites, see *Meteorites*.
Agassiz, A., Cretaceous and recent Echinid faunæ, 40.
  Challenger Echinoidea, 75.
  obituary of C. Wyville Thomson, 496.
Air-thermometer for chemical purposes, 143.
Alizarin-orange, preparation of, 486.
Allantoin, in vegetables, 147.
Alloys, formation of, by pressure, 485.
Ammonium tribromide, 145.
Animals, see ZOOLOGY.
Association, American, 495.
Asteroids, see *Planets*.
Astronomische Nachrichten, 160.

B

Bailey, W. W., Botanical Collector's Handbook, 246.
Baillon, H., Monographie des Composées, 492.
Barker, G. F., chemical abstracts, 143, 234, 409, 482.
Becquerel, H., magnetic properties of nickeliferous iron, 229.
Beebe's Four-Place Tables, 162.
Bell, A. G., apparatus for determining the position of a projectile of metal in the body, 46.
Bentham, G., Notes on Gramineæ, 244.
Bohnensieg, Annual of Botanical Literature, 70.
Boss, comet vii, 1881 (Swift), 77.
Boston city water, 250.
BOTANY—
  Algæ in animals, 328, 329.
  Asia, plants of, 245.
  Compass-plants, 159.
  Coniferæ, female flowers of, 418.
  Coriaria, 159.
BOTANY—
  Flora Brasiliensis, 244.
  Hypericum, 245.
  Ilex, 159.
  Leaves, motions of in the light, 245.
  Lepturus paniculatus, 71.
  Lichens, North American, 326.
  Metallic oxides in plants, 491.
  Monochasma, 159.
  Nomenclature, 157.
  Philozoon, 329.
  Plants, respiration of, *Wilson*, 423.
  Resins, office of, in plants, 494.
  Schænonardus Texanus, 71.
  Spongilla in Boston city water, 250.
  Timber-line, *Gannett*, 275.
  "Yellow cells" of radiolarians and cœlenterates, 328.
  Zoochlorella, 329.
  See further under GEOLOGY.
Brooks, W. K., Invertebrate Zoology, 491.
Bullet, apparatus for determining the position of in the body, *Bell*, 46.
Burnham, S. W., transit of Mercury, 1881, 48.

C

Cæsium, production and properties of, 411.
Carbon oxysulphide, physical properties of, 484.
Carbon sulphobromide, new, 483.
Chemical change, illustration of, 237.
Chemistry, celestial, *Hunt*, 123.
Chinoline, reactions of, 146.
Chlor-ethyl oxide, symmetrical, 485.
Cinchona bark, new alkaloid from, 412.
Cincinnati Society of Natural History, Journal of, 65.
Claassen, E., potassium chloride in absinth, 323.
  analysis of siderite, 325.
Clarke, J. M., new Devonian phyllopods, 476.
Clerk-Maxwell, J., Treatise on Electricity, 149.

* This Index contains the general heads BOTANY, GEOLOGY, MINERALOGY, OBITUARY, ZOOLOGY, and under each the titles of Articles referring thereto are mentioned.

Coal, see GEOLOGY.
Color correction of double objectives, *Hastings*, 167.
Comet vii, 1881, elements of, 77.
Comets, notation of, 160.
Cook, G. H., New Jersey Geological Report, 325.
Cooke, J. M., Gundlachia in western New York, 248.
Cope, E. D., Eocene vertebrates of New Mexico and Wyoming, 324.
Copper implements, how formed, 162.
Crosby, W. O., geology of Frenchman's Bay, Maine, 64.
Cross, W., minerals in basalt of Table Mountain, 452.
Cymene, preparation of, 412.

D

Dana, E. S., monetite crystals, 405.
Third Appendix to Dana's Mineralogy, 491.
Dana, J. D., flood of Connecticut valley glacier, 87, 179, 360.
Darton, N. H., new locality for Hayesine, 458.
Darwin, F., movements of leaves in the light, 245.
Darwin, G. H., lunar disturbance of gravity, 49.
Daubrée, joints in strata, 63.
Derby, O. A., geology of the diamond, 97.
gold-bearing rocks of Minas Geraes, Brazil, 178.
Brazilian specimens of martite, 373.
Diffusion of solids into solids, 409.
Dinosauria, see GEOLOGY.
Dissocioscope, 235.
Draper, H., photographs of spectrum of nebula of Orion, 339.
Drops floating on water, 50.
Duncan, P. M., Arctic Echinodermata, 247.
Dutton, C. E., Fisher's Physics of the Earth's Crust, 283.
Dynamo-electric machine, 147.

E

Earth, density of, 51.
physics of crust of, 283.
Earthquake in Ischia, 337.
Earthquakes, American, *Rockwood*, 257.
of Switzerland, 337.
Earths, metals of the rarer, 412.
Eastman, J. R., solar parallax, 160.
Edison's electrical meters, 52.
Eichler, A. W., Jahrbuch des königlichen botanischen Gartens, 70.
female flowers of Coniferæ, 418.
Electrical meters, Edison's, 52.
rays, reflection of, 413.
resistance of gases, 321, 487.
of a vacuum, 149, 487.
units, 241.
Electricity, inertia of, 240.
storage of, 414, 415.
Electrification by evaporation, *Freeman*, 428.
Electrodes, disintegration of, 240.
Electrolytes, dielectric polarization in, 321.
Electro-magnetism, theory of, 240.
Elliott, H. W., Seal-islands of Alaska, 334.
Emerson, B. K., dyke of Elæolite-syenite in New Jersey, 302.
diabase intersecting zinc ore, 376.
Englemann, G., female flowers of Coniferæ, 418.
Engler, Botanische Jahrbücher, 71.
Ether, nature of, *Hunt*, 123.

F

Farlow, W. G., botanical notices, 159, 326, 329.
Fewkes, J. W., a Cercaria with caudal setæ, 134.
Fisher, O., the Earth's Crust, 283.
Flames, new arrangement for sensitive, 51.
Fossil, see GEOLOGY.
Foye, J. C., Tables for Determination of Minerals, 418.
Freeman, S. H., electrification by evaporation, 428.
Furman, J. H., copper-bearing region in northern Texas, 65.
Fusion, see *Melting points*.

G

Gannett, H., the timber-line, 275.
Gas-densities, determination of, 409.
Gases, electrical resistance of, 321, 487.
viscosity of rarefied, 239.
Geikie, A., Director-general of geological survey of Great Britain, 338.
Geological Congress, Bologna, 150.
GEOLOGICAL REPORTS AND SURVEYS—
Minnesota, 62, 64.
New Jersey, 325.
United States, 382, 452.
Territories, 153.
GEOLOGY—
Amygdaloid of Brighton, Mass., 65.
Anthracite of Colorado, 64.
Basalt of Table Mountain, 452.
Brick-clays making cream-colored bricks in Minnesota, 64.
Cincinnati rocks, fossils of, 65.

GEOLOGY—
Climatic changes of later times, *Whitney*, 489.
Coal, coking, of Colorado, 64.
Coal-field near Cañon City, Cal., 152.
Connecticut river glacial flood, *Dana*, 87, 179, 360.
Copper-bearing region in Texas, 65.
Diabase intersecting zinc ore, *Emerson*, 376.
Diamond, geology of, *Derby*, 97.
Dinosauria, classification of, *Marsh*, 81.
Echini, Cretaceous and recent, *Agassiz*, 40.
Echinognathus, *Walcott*, 213.
Eocene of Wyoming and New Mexico, 324.
Eozoon, controversy on, 418.
Eurypterus, new, *Walcott*, 151, 213.
from near Buffalo, 418.
Evaporation and eccentricity as co-factors in glacial periods, 61.
Foyaite dyke, New Jersey, *Emerson*, 302.
Frenchman's Bay, Maine, 64.
Glacial era climate, *Woeikof*, 417.
erosion in Maine, 242.
flood, 418.
of Connecticut Valley, *Dana*, 87, 179, 360.
periods, evaporation and eccentricity in, 61.
phenomena in Maine, 242.
in Minnesota, 62.
on the Delaware, 242.
scratches in the Catskills, 338.
Glaciers, movement of, 59.
periodical variations of, 56.
of Greenland, 363.
Gold-bearing rocks, Brazil, *Derby*, 178.
Jointed structure in clay and marl, *Le Conte*, 233.
Joints, in strata near Paris, 63.
post-Glacial, *Gilbert*, 25.
Jura-Trias of S.W. Colorado, 243.
Lakes of Minnesota, 62.
Mollusks, descent of, *White*, 382.
Monticulipora, 491.
Petroleum of British America, 154.
Phyllopods, new Devonian, *Clarke*, 476.
Pœcilopod in the Utica slate, 151.
Pterodactyles, wings of, *Marsh*, 251.
Pterygotus from near Buffalo, 418.
Soil-cap motion, 59.
Syenite, Quincy, 418.
Tides in early time, 323.
Trilobites, Primordial in Sardinia, 65.
Vertebrates, Eocene, *Cope*, 324.
Geysers, apparatus illustrating action of, 320.
Gibbs, J. W., double refraction and dispersion of colors, 262.
double refraction and circular polarization, 460.
Gilbert, G. K., post-Glacial joints, 25.
Glacier, etc., see GEOLOGY.
Gould, B. A., algebraic expression of diurnal variation of temperature, 99.
Gravity, lunar disturbance of, 49.
Gray, A., botanical notices, 69, 159, 244, 326, 492.
nomenclature, 157.
compass-plant, 160.
botanical necrology, 330.
Greenland, Flora of, not., 247.
glaciers of, 363.
Groth, P., Tabellarische Uebersicht der Mineralien, 157.
Guides for Science Teaching, 336.

H

Hague, A. D., Mining Industries, 162.
Hailstorms, 249.
Hall, J., Bryozoans of the Upper Helderberg, 153.
Halogens, vapor-density of, 143.
Hastings, C. S., color correction of double objectives, 167.
Hazen, W. B., Signal Service Report, 78.
Heat, Fourier-Poisson theory of conduction of, 322.
Heilprin, A., Tertiary of Eastern and Southern United States, 153.
Hilgard, J. E., appointed superintendent of Coast Survey, 162.
Hill, E., evaporation and eccentricity in glacial periods, 61.
Hillebrand, W. F., minerals in basalt of Table Mountain, 452.
Hills, R. C., Jura-Trias of southwestern Colorado, 243.
dioptase from Arizona, 325.
Holden, E. S., transit of Mercury, 1881, 48.
rings of Saturn, 387.
Holman, S. W., method for calibrating thermometers, 278.
Hooker, J. D., Icones Plantarum, 71.
Huggins, W., photograph of spectrum of nebula of Orion, 335.
Hungerford, E., snow and ice under pressure, 434.
Hunt, T. S., celestial chemistry, 123.
Hydrogen phosphide, spontaneously inflammable, 144.

I

Ice under pressure, *Hungerford*, 434.
Iles, M. W., smaltite in Colorado, 380.
vanadium in Leadville ores, 381.

Illinois Museum of Natural History, Bulletin of, 417.
Iron, determination of phosphorus in, *Smith*, 316.
magnetic properties of a nickeliferous, 229.

J

Judd, J. W., Volcanoes, 65.

K

Kayser, H., velocity of sound in wood, 415.
Klangfarbe, 147.
Kokscharof, N. v., Russian Mineralogy, 68.

L

Lalande prize, 250.
Lapparent, Traité de Géologie, 154.
Leaves, see BOTANY.
LeConte, J., sound-shadows in water, 27.
jointed structure in clay and marl, 233.
Lichtenberg's figures, 240.
Light, absorption of, 50, 486.
electro-magnetic theory of, *Gibbs*, 262, 460.
interference phenomena of, *Michelson*, 395.
rotation of plane of polarization of, 148.
spectroscopic observations with monochromatic, 322.
Loomis, E., contributions to meteorology, 1.

M

Madan, H. G., Tables of Qualitative Analysis, 150.
Magnetism as affected by hardening, 414.
Magnetization, maximum of, 413.
Man, Paleolithic in Delaware valley, 152.
Marsh, O. C., classification of the Dinosauria, 81.
wings of Pterodactyles, 251.
Martius, E. v., Conchologische Mittheilungen, 422.
Maximowicz, C. J., Coriaria, etc., 159.
Diagnoses Plantarum novarum Asiaticarum, 245.
McGee, W. J., evaporation and eccentricity in glacial periods, 61.
Melting points, apparatus for determining, 482.
Mendenhall, Meteorology of Tokio, 496.
Mercury, transit of, 1881, 48.
Meteorites, supposed organisms in, 156.
Meteorology, contributions to, *Loomis*, 1; *Woeikof*, 341; *Mendenhall, Caswell*, 496.
Meyer, V., vapor-density of the halogens, 143.
Michelson, interference phenomena, 395.
Millimeter screw, *Wead*, 176.
MINERALS—
Analcite, 457.
Bergamaskite, 155.
Chabazite, 454.
Chrysolite, artificial, 155.
Diamond, 97.
Dioptase from Arizona, 325.
Dopplerite, 154.
Enstatite, 155.
Hayesine, 458.
Hematite, polyhædral cavities in, 67.
Hiddenite, 68.
Iron, a nickeliferous, 229.
Litidionite, 155.
Martite, Brazilian, 373.
Melanotekite, 155.
Monetite, 400, 405.
Monite, 400.
Nocerine, 155.
Orthoclase, 67.
Phytocollite, 155.
Pyroclasite, 400.
Quartz crystals, in sandstones, 257.
Siderite, analysis of, 325.
Smaltite in Colorado, 380.
Thomsonite, 455.
Vanadium, 381.
Museum, American, Bulletin of, 153.
of Comparative Zoology, Bulletin, 422.

N

Naumann, C. F., Mineralogie, not., 68.
Nebula of Orion, photograph of spectrum of, *Huggins*, 335; *Draper*, 339.
Newberry, J. S., coking coal and anthracite of Colorado, 64.
Newton, H. A., notation of comets, 160.
astronomical notices, 160.
minor planets, 249.
notice of Peirce's Algebra, 336.
Nitrogen oxides, action of on glass, 55.
Nomenclature, natural history, 157.
Nordenskiöld, A. E., Voyage of the Vega, 336.
Norton, W. A., Treatise on Astronomy, 496.

O

OBITUARY—
Andersson, Nils J., 333.
Austin, Coe F., 332.
Barnard, Gen. John G., 498.
Darwin, Charles Robert, 422.

OBITUARY—
Decaisne, Joseph, 331.
Desor, E., 422.
Draper, John W., 163.
Godron, Dominique Alexandre, 333.
Hampe, Ernst, 333.
James, Thomas P., 330.
Lindsay, W. Lauder, 333.
Mallett, Robert, 80.
Mead, S. B., 333.
Morgan, Lewis H., 166.
Munro, Gen. Wm., 333.
Rabenhorst, Gottlieb Ludwig, 333.
Schimper, Wm. Philip, 333.
Schleiden, Matthias Jacob, 333.
Schwann, Theodore, 333.
Thomson, C. Wyville, 338, 496.
Vaux, William S., 498.
Wheatley, Charles M., 498.
Wood, Alphonso, 333.
Objectives, color correction of double, *Hastings*, 167.
Observatory, Harvard College, Report of, 161.
Morrison, longitude of, 77.
National, publications of, 160, 495.
Optics, physiological, *Stevens*, 290, 346.
Organic liquids, physical properties of, 234.
critical temperatures of, 483.
Owen, R., Cephalopoda, 72.
Oxides, effect of, in the decomposition of potassium chlorate, 236.
Oxygen, production of active, 410.

P

Packard, A. S., Jr., Cambarus primævus, 153.
Chatauqua Scientific Diagrams, 418.
Peirce, B., Linear Associative Algebra, 336.
Peptones, theory of, 146.
Persulphuric oxide, so-called, 410.
Petroleum hydrocarbons, splitting of, 237.
of the Caucasus, 145.
Phillips, F. C., absorption of metallic oxides by plants, 491.
Phosphorescence, 322.
Phosphorus oxide, 144.
Pickering, E. C., Observatory Report, 161.
Planets, list of minor, 249, 334.
see also, *Mercury*, etc.
Potassium permanganate, 336.
chloride in Absinth, 323.
Potential, difference of, between a metal and fluids of different concentration, 487.
Poulsen, V. A., Botanische Mikrochemie, 328.
Powell, J. W., Report of Bureau of Ethnology, 422.
Protoplasm, nature of living, 238.
Pterodactyles, see GEOLOGY.
Putnam, F. W., palæolithic implements of the valley of the Delaware, 152.

Q

Quinones, constitution of, 486.

R

Rain-fall, annual, *Loomis*, 1, *Woeikof*, 341.
Rattan, V., Popular Californian Flora, 495.
Refraction, double, *Gibbs*, 262, 460.
elliptical double, 487.
Regelation, *Hungerford*, 434.
Remsen, I., Boston city water, 250.
Reports of Engineers, index of, 336.
Richards, E. H., Chemistry of Cooking and Cleaning, not., 416.
Rockwood, C. G., American earthquakes, 257.
notice of Judd's Volcanoes, 65.
notes on earthquakes, 337.
Rosin oil, metaisocymene in, 238.

S

Saturn, rings of, *Holden*, 387.
Schæberle, J. M., flexure of a telescope tube, 374.
Schott, C. A., rain and snow tables, 250.
Screw, millimeter, *Wead*, 176.
Sea-water, carbonic acid in, 53.
Seismological Commission, Swiss, 337.
Shepard, C. U., monetite, monite and pyroclasite, 400.
Siemens, W., dynamo-electric machine, 147.
Signal Service Report, 78.
Silliman, B., obituary of Draper, 163.
aconitic acid from Sorghum juices, 488.
Smith, J. L., magnetic properties of nickeliferous iron, 232.
determination of phosphorus in iron, 316.
Snow, effect of pressure on, *Hungerford*, 434.
Solar, see *Sun*.
Sonometer, organ-pipe, *Stevens*, 479.
Sophorin, 413.
Sound, velocity of in wood, 415.
Sound-shadows in water, *Le Conte*, 27.
Spectroscopic observations with monochromatic light, 322.
Stahl, E., Compass-plants, 159.
Stars, observations of double, 334.
Stereoscope, reversible, *Stevens*, 226.

Stevens, W. L., new form of reversible stereoscope, 226.
notes on physiological optics, 290, 346.
organ-pipe sonometer, 479.
Stevenson, J. J., coal-field near Canon City, Colorado, 152.
Stone, G. H., glacial erosion in Maine, 242.
Sulphur oxychloride, new, 484.
Sun, parallax of, 161.
heat of, 487.
Swiss Seismological Commission, 337.

T

Telescope tube, flexure of, *Schæberle*, 374.
Temperature, change of from mechanical strains, 321.
diurnal variation of, *Gould*, 99.
Thompson, S. P., Lessons in Electricity and Magnetism, 241.
Tides in early geological time, 323.
Timber line, *Gannett*, 275.
Tones, harmonic and partial, 147.
Trowbridge, J., physical notices, 49, 147, 239, 320, 413, 486.
Tschermak, G., Lehrbuch der Mineralogie, 68.
Tuckerman, E., North American Lichens, 326.
Turner, W., Names of Herbes, 326.

V

Vacuum, electrical resistance of, 149, 487.
Vapor-density of the halogens, 143.
Veitch, J., Manual of the Coniferæ, 69.
Verrill, A. E., Architeuthis at Newfoundland, 71.
Owen's Cephalopoda, 72.
Agassiz's Echinoidea of the Challenger Expedition, 75.
marine fauna of outer banks off New England coast, 135, 216, 309, 406.
Duncan and Sladen's Echinodermata of the Arctic Sea, 247.
Vibrations, effect of on a suspended disc, 51.
Vilmorin-Andrieux, Les Meilleurs Blés, 494.
Viscosity of rarefied gases, 239.
Vision, phenomena of, *Stevens*, 290, 346.
Volcanoes, Judd on, 65.
Vries, H. De, Resinous Matters in Plants, 494.

W

Walcott, C. D., Pœcilopod in the Utica slate, 151.
new genus of Eurypterida, 213.
Waldo, L., Micrometrical Measurements of Double Stars, 334.
Ward, L. F., Guide to the Flora of Washington, 492.
Wead, C. K., millimeter screw, 176.
Wetherby, A. G., distribution and variation of fresh-water mollusks of N. America, 76, 203.
White, C. A., descent of certain fresh-water mollusks, 382.
Whitfield, R. P., paleontological papers, 153, 496.
Whitney, J. D., Climatic Changes of later Geological Times, 489.
Wiik, F. J., Mineral Karakteristik, 69.
Wilder, B. G., Brain of the Cat, 160.
Wilson, S. D., respiration of plants, 423.
Winchell, N. H., Minnesota Geological Report, 62.
clays making cream-colored bricks, 64.
Wires, change of temperature from mechanical strains in, 321.
Woeikof, A., mean annual rain-fall, 341.
Glacial-era climate, 417.

Y

Young, A. A., sandstones having the grains in part quartz crystals, 257.

Z

ZOOLOGY—
Actinaria, New England, *Verrill*, 314.
Animals containing Algæ, 328, 329.
Anthozoa, New England, *Verrill*, 309.
Architeuthis at Newfoundland, 71.
Cephalopoda, 72.
Cercaria with caudal setæ, *Fewkes*, 134.
Ducks, domestication of wild, 421.
Echinoderms, arctic, 247.
New England, *Verrill*, 138, 216.
Cretaceous and recent, *Agassiz*, 40.
Gundlachia in western New York, 248.
Madreporaria, New England, *Verrill*, 313.
Marine fauna, New England, *Verrill*, 135, 216, 309, 406.
Mollusks, descent of, *White*, 382.
distribution of, *Wetherby*, 76, 203.
Nomenclature, 157.
"Yellow cells," see BOTANY.
See further under GEOLOGY.